DIRECTIONAL EVOLUTION

EXTENDED ABSTRACT

One way to conceptualize how evolution does not explain away God has focused on guided as opposed to unguided evolution. Thus God's actions has variously been located at the level of fine-tuning the initial conditions of life (e.g. Plantinga 2011) or fine-tuning the constraints that determine convergent evolution (e.g. Conway-Morris 2003). In each case a hypothesis is being added onto standard Darwinian evolution. In this paper I would like investigate whether this is necessary and will do so by examining the wide-spread but relatively unexplored assumption, namely, that evolution by natural selection *alone* cannot be directional. I will argue that the assumption is based on an unfounded generalization of adaptationism, and that there are in fact certain 'global' directions present in evolution by natural selection, such as towards behavioral flexibility, or towards cooperation. The notion of God compatible with such an understanding of life is not as creator of the blueprints of organisms (Paley), or as creator of constraints and laws (Conway Morris), but as creator of several important *global tendencies* inherent in life itself while leaving room for considerable contingency in evolution.

Directionality in Evolution

The fact that evolution by natural selection is *locally* directional is uncontroversial: by definition, a population undergoing natural selection tends towards the state of highest fitness. Local here means relative to an environment, because it is environmental structure (together with the nature of the organisms) that determines which traits lead to optimal reproductive success and thus are adaptive. By contrast, *global* directions are usually held not to exist because environments are so variable over time. Hence neither does it make any sense to speak of 'progression' in evolution, because evolution is the mere succession of adaptations.

In this way, Conway Morris' argument (2003) for a global directionality in the 'inevitability' of human beings fails because he bases it on this notion of local directionality. Thus, for example, Conway Morris argument for the inevitability of sentience is based on its observed ubiquity across independent lineages of the biosphere (and also 'inherency', the ubiquity of the basic structures necessary for sentience to develop). However, one can reply that sentience is so ubiquitous because of very specific environments that are contingently present on Earth. Strictly speaking, there is nothing inevitable about sentience. In this way, because convergent evolution is a form of adaptationism, it can provide no ground for any global direction.

Complexity has been another candidate for global directionality (e.g. McShea 1994). Over the course of evolutionary history, increasingly 'complex' (both in the functional and morphological sense) organisms have appeared. However, as Gould (1996) argues, it is problematic to see any global directionality in this. Evolution started from a minimal complexity, so if we take the statistical nature of evolution into account, it is quite to be expected that complexity has increased in the short term *even if there is a tendency towards simplicity.* In fact, many lineages (such as parasites) have evolved towards simpler structures.

In this way, after treating convergence and complexity in some detail, in the paper I argue that if one is to look for a global direction in evolution, one must look for a trait whose adaptiveness is not contingent on any particular environmental structure. This means only traits that are adaptive in virtue of properties that all structures possess.

I propose a candidate: *variability in environmental structure*. In a fixed environment, a fixed, instinctual behavior will be optimal. However, in a *variable* environment, behavioral *flexibility* will be adaptive. (The variability cannot be too large either: see Godfrey-Smith 1998 for a signal-detection model of behavioral flexibility.) Variability is not a biological property of any one environment, but is a property of at least two environments. The question is, how contingent is the condition of variability in environmental structure? I argue that it is not only not contingent, but even inherent in evolution by natural selection, as natural selection requires competition among various phenotypes to even act.

In this way, merely because behavioral flexibility adaptive in a variable environment, and variability is inherent in natural selection itself, it can be argued that there is a *global tendency* towards behavioral flexibility.

I argue that this conception of global directionality avoids the short-comings of classic teleology: monism, universality, and necessity. First, 'global' does neither mean that it is the only such tendency. Other global tendencies can be suggested, such as sensitivity to information-content, or cooperation and eusociality. Neither is such a tendency universal: there is a plurality of ecological niches, and not all of them contain variable environments. Nor does it mean that global tendencies are inevitable: circumstances and constraints could conspire against its occurrence, for example in an inhospitable world where only *extremophile* bacteria can survive. In merely means that the tendency is inherent in evolution by natural selection itself, and contingent on a particular environment.

A compatible notion of God

In some ways this represents a statistical understanding of teleology, and there are some theological ramifications with respect to the question of the conference. Unlike Paley's God, who creates blueprints of organismic structure, or Conway Morris' God, who creates the constraints and laws that make convergent evolution possible, the notion of God suggested here is a being which creates these global tendencies.

Because of the statistical nature of these tendencies, such a God would allow for contingency and plurality in the world, and also would connect natural tendencies to the notion of *imago dei.* My remarks here remain merely suggestive: for example, certain ideals that many religions promote, such as forgiveness or generosity, serve to break open closed or tribal social structures and to promote flexibility. The same global tendencies governing the evolution of life resurface in altered forms in religious ideals. In this way, I suggest that it's not only *possible* but also

plausible that evolution not only does not explain away God, but could in fact reinforce belief in God.

Length without references: 991 words

References

Plantinga, Alvin. 2011. *Where the Conflict Really Lies: Science, Religion, and Naturalism. Oxford:* Oxford University Press

Conway Morris, Simon. 2003. *Life's Solution : inevitable humans in a lonely universe*. Cambridge: Cambridge University Press.

McShea, D.W. 1994. Mechanisms of large-scale evolutionary trends. Evolution 48:1747-1763. Mechanisms.

Gould, Stephen J. 1996. *Full House: The Spread of Excellence from Plato to Darwin,* 167-216. Cambridge, MA: Belknap Press.